

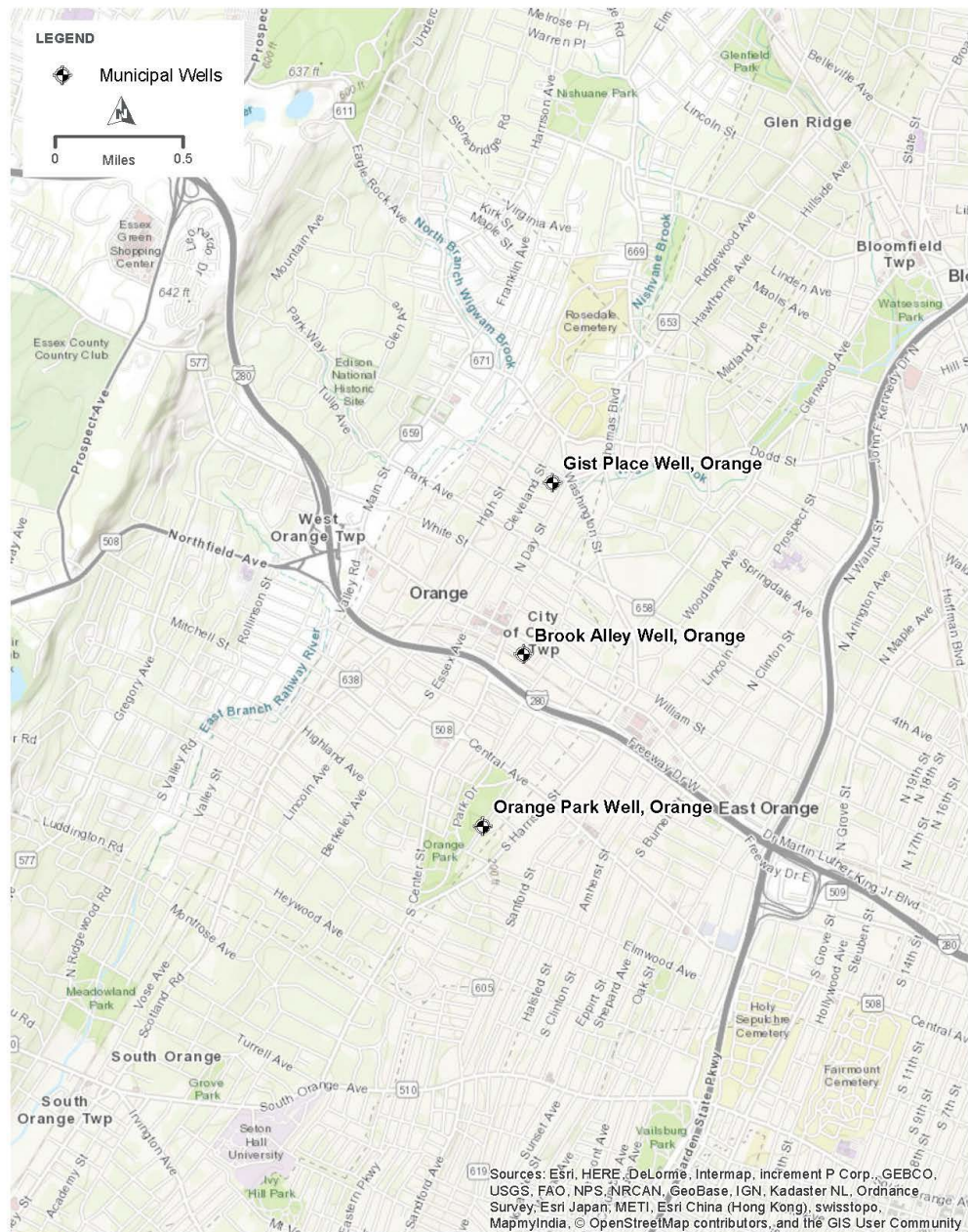
Orange Valley Regional Groundwater Contamination

October 13, 2020 Update

Remedial Investigation / Source Investigation
Reduced Scope
024-RICO-0219



654167



STUDY AREA AND PWS LOCATIONS
ORANGE VALLEY REGIONAL GROUNDWATER

FIGURE 1

Site History

- Orange Park Municipal Supply Well installed March 1967
- Gist Place Municipal Supply Well installed February 1970
- Brook Alley Municipal Supply Well installed December 1971
- First known CVOC impact of the Wells was in June 1985
- Wells were resampled in December 1985 and June 1986
- NJDEP directed City to cease Brook Alley pumping, use Gist Place on emergency basis only and to monitor Orange Park
- Brook Alley off line 1986, others on CVOC treatment in 1988-89
- Monthly monitoring continued as part of the NJDEP directive

Site History Continued

- 2007 - NJDEP advised City of Orange to sample for PFOS and PFOA
- 2008 – NJDEP required continual PFOS/PFOA monitoring and a reduction plan based on the 2007 results
- 2014 – NJDEP expanded monitoring requirement to include 10 PFCs
- Orange Park Well shut down in 2014, due to PFOA
- 2015 - NJDEP recommended ceasing pumping at Gist Place and Orange Park until treatment was installed
- Gist Place Well shut down in July 2015, due to PFOA
- PFOA were above guidance value (at that time) of 40 ng/l
- At that time, NJDEP notified the City that New Jersey Drinking Water Quality Institute was evaluating MCLs for three PFAS compounds
- Brook Alley Well pump removed by EPA/HDR in 2016
- Brook Alley Well decommissioned and sealed by City of Orange in 2018

Orange Supply Well CVOC Summary

Gist Place				
Year	# of samples	High Annual DCE	High Annual PCE	High Annual TCE
1985	2	NA	26	13
1986	1	NA	27	12
2009	26	2.17	37.1	14.9
2010	24	2.18	45	13.2
2011	24	1.86	36	10.1
2012	23	1.81	36.2	7.79
2013	16	1.83	40.5	6.54
2014	11	1.52	34.9	4.16
2016	1	0.75	13	2.1
2019	1	0.84	13	1.33
Orange Park				
Year	# of samples	High Annual DCE	High Annual PCE	High Annual TCE
1985	2	NA	5	6
1986	1	NA	ND	ND
2009	24	1.63	13.3	3.59
2010	24	1.37	12.2	2.97
2011	21	1.07	9.48	2.13
2012	17	0.37 J	7.56	0.76
2013	9	0.47 J	7.77	1.11
2014	0	--	--	--
2016	1	ND	0.31	ND
2019	2	ND	ND	ND
Note: concentrations are ug/l				
NA - not analyzed				
ND - not detected				

PFAS Results at Gist Place - 2014

Orange Water Department
Results of Testing for 10 Perfluorinated Compounds
2014

Treatment Plant Name	Sample Collection Date	Parameter Name	Result (ng/L)
GIST PLACE	2/27/2014	Perfluoro octanesulfonic acid - PFOS	23
GIST PLACE	2/27/2014	Perfluoro octanoic acid - PFOA	71
GIST PLACE	5/12/2014	Perfluoro octanesulfonic acid - PFOS	15
GIST PLACE	5/12/2014	Perfluoro octanoic acid - PFOA	36
GIST PLACE	5/12/2014	Perfluoro-n-nonanoic acid - PFNA	1.4
GIST PLACE	8/5/2014	Perfluoro octanesulfonic acid - PFOS	13
GIST PLACE	8/5/2014	Perfluoro octanoic acid - PFOA	28
GIST PLACE	8/5/2014	Perfluoro-n-nonanoic acid - PFNA	5
GIST PLACE	11/19/2014	Perfluoro octanesulfonic acid - PFOS	19
GIST PLACE	11/19/2014	Perfluoro octanoic acid - PFOA	83
GIST PLACE	11/19/2014	Perfluoro-n-nonanoic acid • PFNA	5

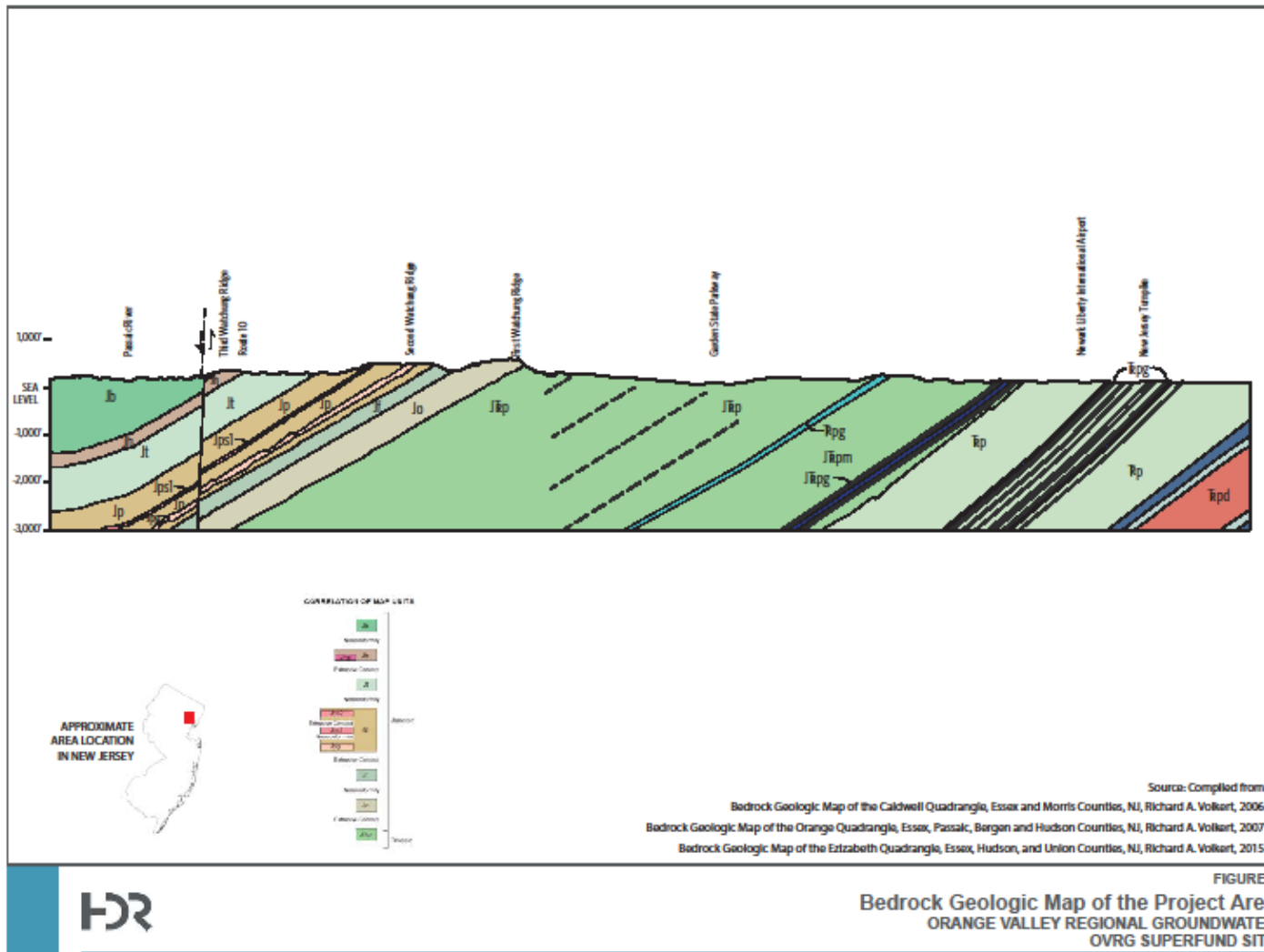
OVRG Administrative Timeline

- June 1985 Contamination first detected in the 3 municipal wells – Brook Alley well removed from service. Gist Place and Orange Park were equipped with air strippers
- 2009 Gist Place, Orange Park (and Well 6) sampled by EPA confirms contamination
- March 2012 Hazard Ranking Score prepared – groundwater only significant pathway
- March 15, 2012 OVRG proposed for NPL
- September 17, 2012 EPA Issues OVRG Work Assignment to HDR
- September 18, 2012 OVRG listed on NPL
- December 14, 2012 HDR prepares Draft Work Plan
- July 12, 2013 HDR prepares Revised Work Plan
- March 26, 2014 Scoping meeting for a reduced scope
- June 5, 2014 HDR prepares Draft Reduced Scope Work Plan
- October 6, 2014 HDR prepares Final Reduced Scope Work Plan
- March 19, 2015 Final QAPP submitted
- March 23, 2015 Final HASP submitted
- October 18, 2016 RI groundwater sampling initiated
- October 19, 2016 Brook Alley Pump removed
- July 24, 2017 Draft Technical Memorandum submitted
- October 10, 2019 Second RI groundwater sampling initiated
- June 10, 2020 Second Draft Technical Memorandum submitted

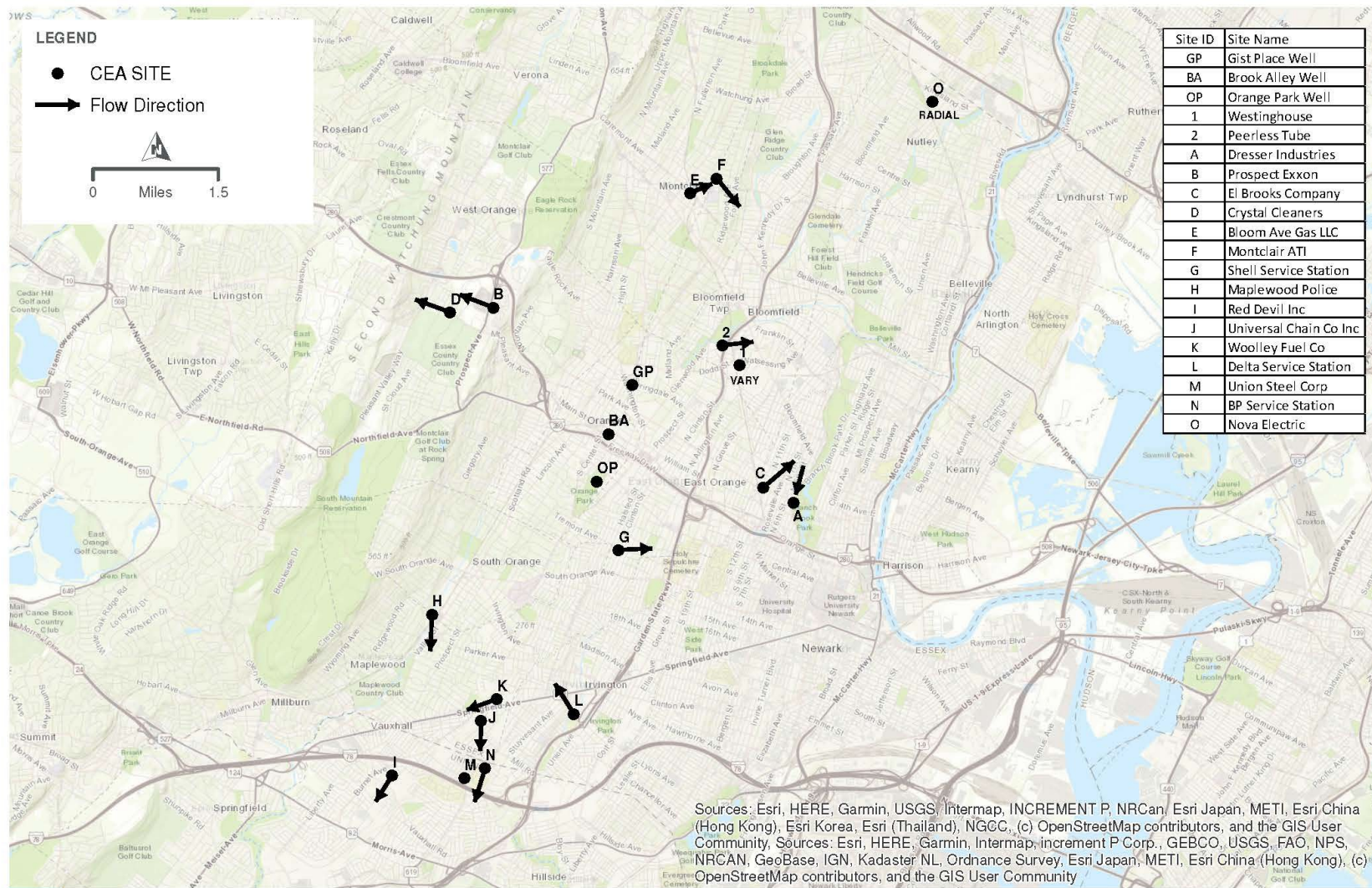
Initial RI/FS Scope Summary

- Well Inventory
- Surficial geophysical survey (GPR, magnetometry, EM, remote sensing)
- 20 bedrock wells incl. 9 deep wells (max 560 feet)
- 20 shallow overburden wells
- Downhole geophysics (10 wells)
- Packer testing (10 wells)
- Rock core sampling (4 cores)
- Matrix diffusion (20 samples per core)
- Hydraulic Testing – cross hole tests/pump test
- Well redevelopment
- Groundwater elevations
- Surface water elevations and surface water/sediment sampling
- Municipal and monitoring well sampling
- Vapor intrusion sampling
- IDW management
- Groundwater modeling
- Existing treatment system evaluation
- Ecological sampling

Groundwater Flow Issues



NJDEP Classification Exemption Areas with Reported Groundwater Flow Direction



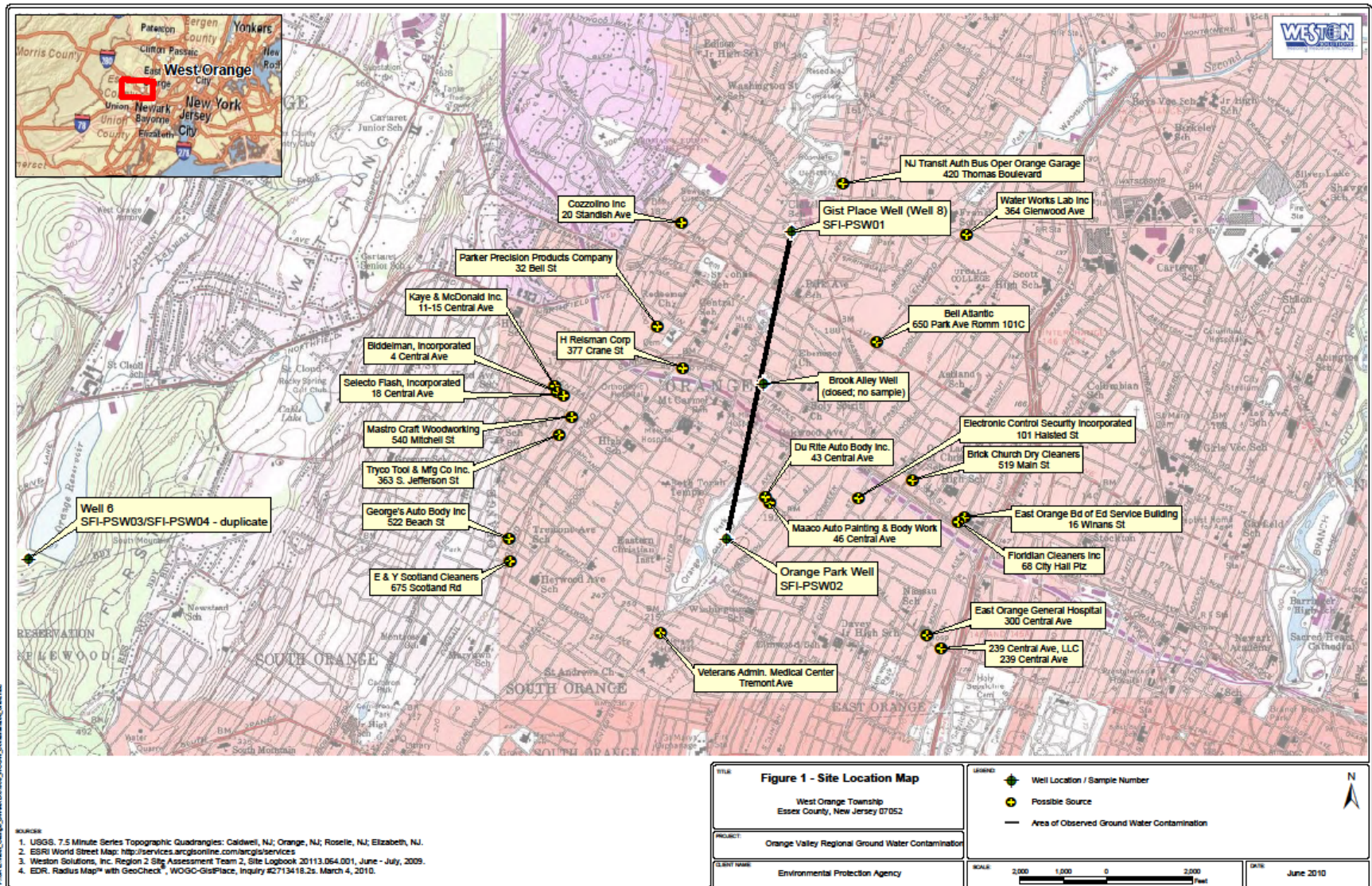
CEA SITES NEAR OVRG WITH CVOCS
ORANGE VALLEY REGIONAL GROUNDWATER

FIGURE XX

Reduced Scope Objective

- Step-Wise Approach to RIFS
- Phase 1 - Provide Information to Assess Similarities
 - characterize conditions at existing wells
 - obtain geological/hydrogeological information to characterize aquifer conditions
 - gather/review information about potential sources
- Phase 2 – Focused Field Investigation
 - describe the groundwater plume and aquifer
 - investigate potential contamination sources
 - close data gaps
 - refine the Conceptual Site Model (CSM)
 - complete the risk assessments

Potential Sources (HRS, 2009)



OVRG Potential Sources noted in HRS

- Biddleman
- SelectoFlash
- UniCorp
- NJ Transit
- Maaco
- EconoCleaner
- Kaye & McDonald – access was not provided
- Banner Chemical – owner interviewed
- West Orange Industrial Center
- Otis Elevator
- Du Rite
- Parker Precision
- Floridian Cleaners
- Cozzolino Furniture
- Tryco Tool
- Water Works Lab
- Scotland Cleaners
- 239 Central Ave, LLC
- Brick Church Dry Cleaners
- Bell Atlantic
- George's Auto Body Shop

Note: Sites in red were sampled, sites in black were not sampled

OVRG 2016 Sites Sampled

- Biddleman – 4 Central Avenue
- SelectoFlash – 18 Central Avenue
- UniCorp – 291 Cleveland Street
- EconoCleaners – 217 Main Street
- NJ Transit – 420 Thomas Boulevard
- Maaco – 46 Central Avenue

LEGEND

- Sampling Location
- Site of Interest

0 Feet 2,000

Map Labels:

- Econo Dry Cleaners MW-6
- NJ Transit Garage MW-7
- Gist Place, Orange Gist Place Well
- Water Works Lab Inc. 364 Glenwood Ave
- Bell Atlantic Romm 101 C
- 650 Park Ave
- West Orange Industrial Center 177 Main St
- Banner Chemical 111 Hill St (95-123 Freeway Dr West)
- Du Rite Auto Body Inc. 43 Central Ave
- Electronic Control Security Incorporated 101 Halsted St
- Floridian Cleaners Inc. 68 City Hall Plz
- East Orange Board of Ed. Service Building 16 Winans St
- East Orange General Hospital 300 Central Ave
- 239 Central Ave, LLC 239 Central Ave
- Oakwood Drive, Orange Orange Park Well
- Manco MW-3
- Brook Alley, Orange Brook Alley Well
- H Reisman Corp 377 Crane St
- 48 S. Day Street 48 South Day St / 263 Reock St
- Parker Precision Products Company 32 Bell St
- Cozzolino Inc. 20 Standish Ave
- Kaye & McDonald, Inc. 11-15 Central Ave
- Biddelman Property MW-12
- SelectoFlash Property MW-4
- Tryco Tool & Mfg Co. Inc. 363 S. Jefferson St
- Mastro Craft Woodworking 540 Mitchell St
- George's Auto Body Inc. 522 Beach St
- E&Y Scotland Cleaners 675 Scotland Rd
- Veterans Admin. Medical Center Tremont Ave
- Harvard Painting 550 Central Ave

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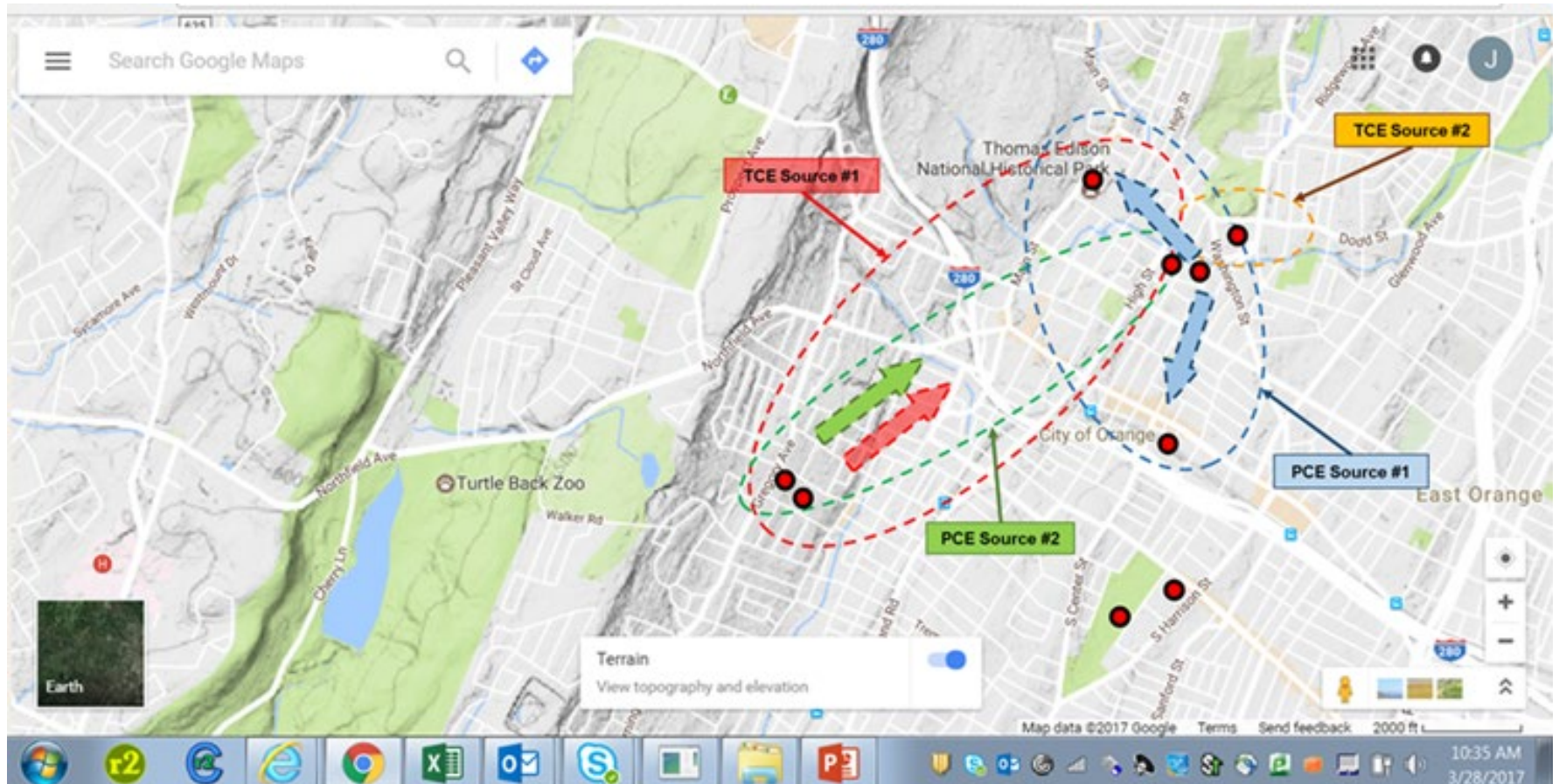
2016 Groundwater Investigation

- Monitoring Well Assessment: Inspect the condition of monitoring wells at several selected sites including depth to water and total depth
- Pump removal from a former municipal supply well (Brook Alley Well)
- Video logging of two former municipal wells
- Collection of groundwater samples from up to nine wells and three municipal wells (October 2016 preliminary sampling)
- Manage investigation-derived waste (IDW)

2016 Analytical Results

- PCE detected above GWQS in 8 of 11 samples
- TCE detected above GWQS in 6 of 11 samples
- Highest PCE concentration detected in Biddleman sample (200 ug/l)
- All but one sample had PFOA and PFOS sums \geq EPA lifetime health advisory limit (70 ng/l)

2016 CSIA Results



2016 CSIA Results Summary

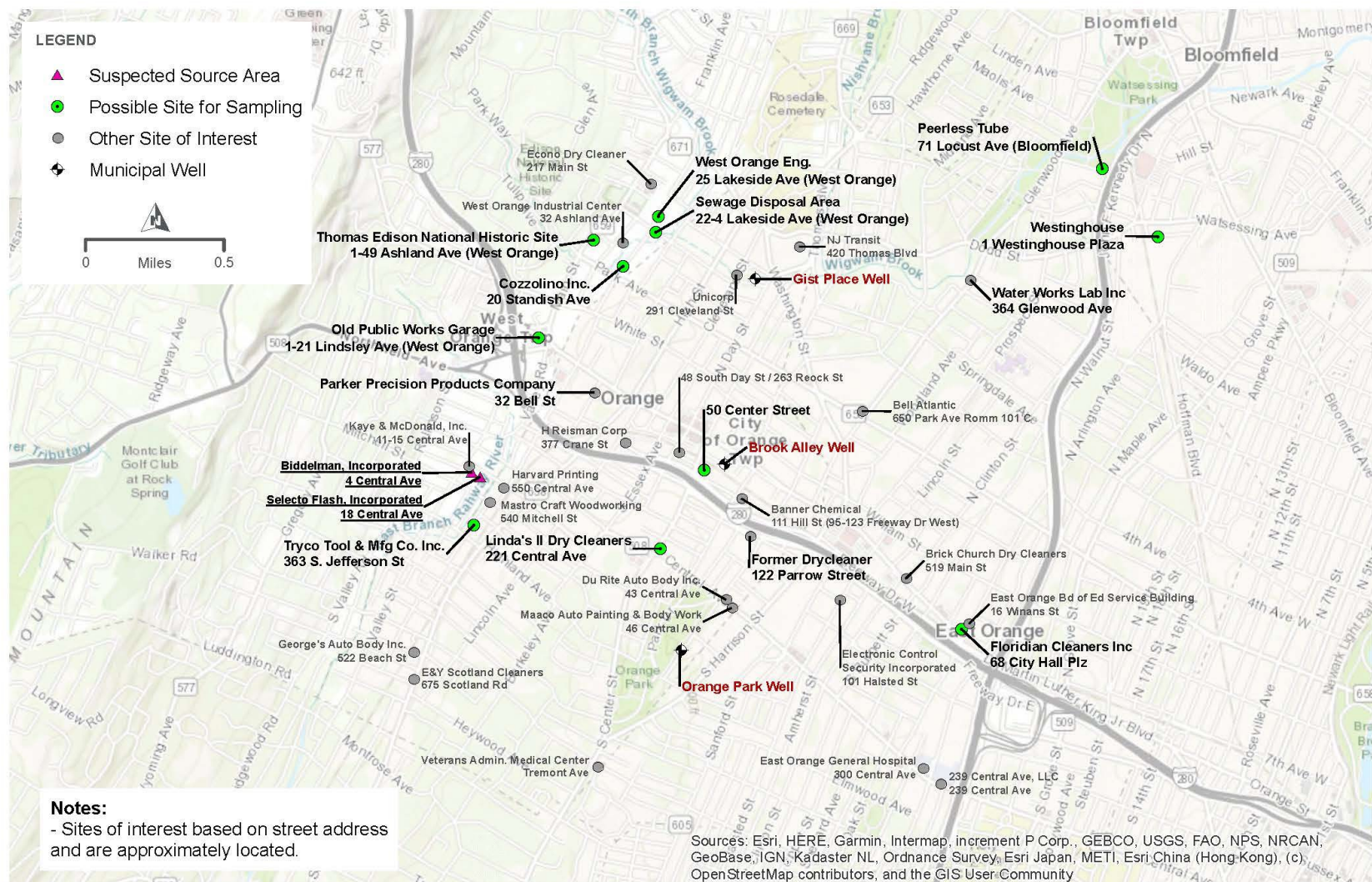
- Two isotopically distinct sources of PCE – one originates near BMMW-12/SFMW-4, the other near GPW-8
- Two isotopically distinct sources of TCE – one originates near SFMW-4, the other near NJTMW-7
- Both PCE and TCE originate near BMMW-12/SFMW-4
- TCE originating near BMMW-12 is from a commercially obtained virgin TCE (hydrogen isotopes indicate no PCE degradation)
- The isotopic enrichment seen indicates that PCE is being degraded by microorganisms to TCE
- The hydrogen isotope data indicate that the TCE in ECMW-1 and GPW-8 is in part from the breakdown of PCE
- Lack of hydrogen isotope data for most of the TCE results limits the interpretations for TCE.
- Groundwater flow was inferred from the isotopic enrichment seen – shown by the colored arrows in the figures.
- The PCE isotope data suggest the Brook Alley well (BAW-) is artesian
- The PCE isotope data indicates that a groundwater divide may be present near GPW-8

2019 Groundwater Investigation

- Monitoring Well Assessment: Inspect the condition of monitoring wells at several selected sites including depth to water and total depth
- Collection of groundwater samples from nine wells and two municipal wells (Brook Alley decommissioned)
- Manage investigation-derived waste (IDW)

Sites Pursued for Sampling in 2019

- Historic Sewage Disposal Area – sampled (WO well offsite)
- Floridian Cleaners – not sampled, no access
- Thomas Edison National Historic Site – sampled (TE wells)
- Westinghouse – not sampled, no access
- Peerless Tube – sampled (PT wells)
- Old Public Works Garage – sampled (OPG wells)
- 4 U Dry Cleaning – sampled (4U wells)
- West Orange Engineering – sampled (WO wells)
- Tryco Tool – sampled (FT wells)
- Cozzolino, Inc. – sampled (CO wells)
- 50 Center Street – not sampled, no wells at this site



POSSIBLE SOURCES WITHIN THE STUDY AREA

ORANGE VALLEY REGIONAL GROUNDWATER

FIGURE XX

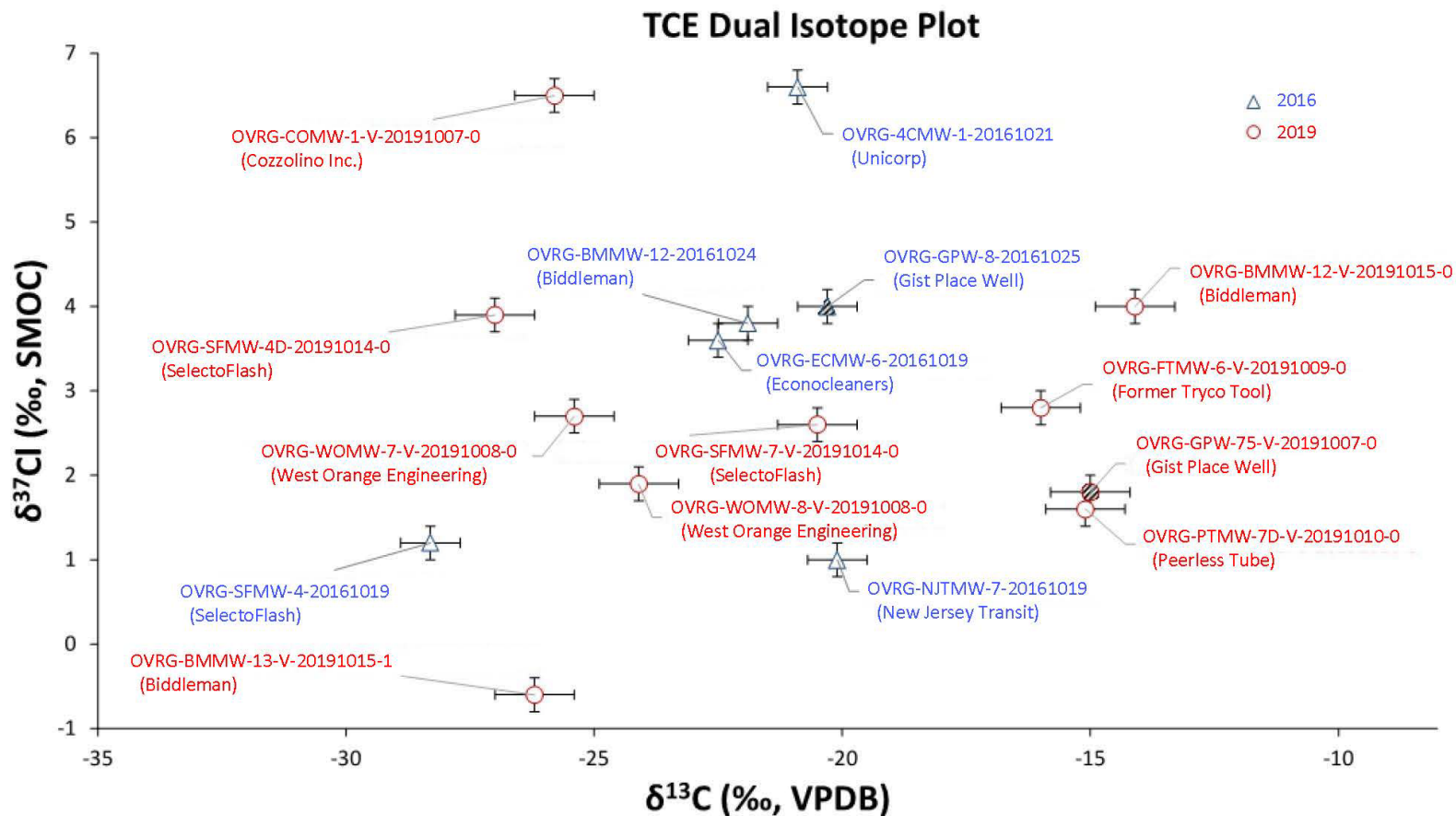
OVRG SUPERFUND SITE



2019 Analytical Results

- PCE detected above GWQS (1 ug/L) in 13 of 19 samples and above MCL (5 ug/L) in 12 samples
- TCE detected above GWQS (1 ug/L) in 11 of 19 samples and above MCL (5 ug/L) in 4 samples
- Highest PCE concentration detected in Biddleman sample (560 ug/l)
- Highest TCE concentration detected in SelectoFlash sample (27 ug/l)
- All but one sample had PFOA and PFOS greater than NJDEP Interim criteria of 10 ng/l
- The sum of PFOS/PFOA was greater than EPA lifetime health advisory limit (70 ng/l) in 13 samples
- High PFOS/PFOA sum was in Biddleman sample (481 ng/l)

2019 CSIA Presentation

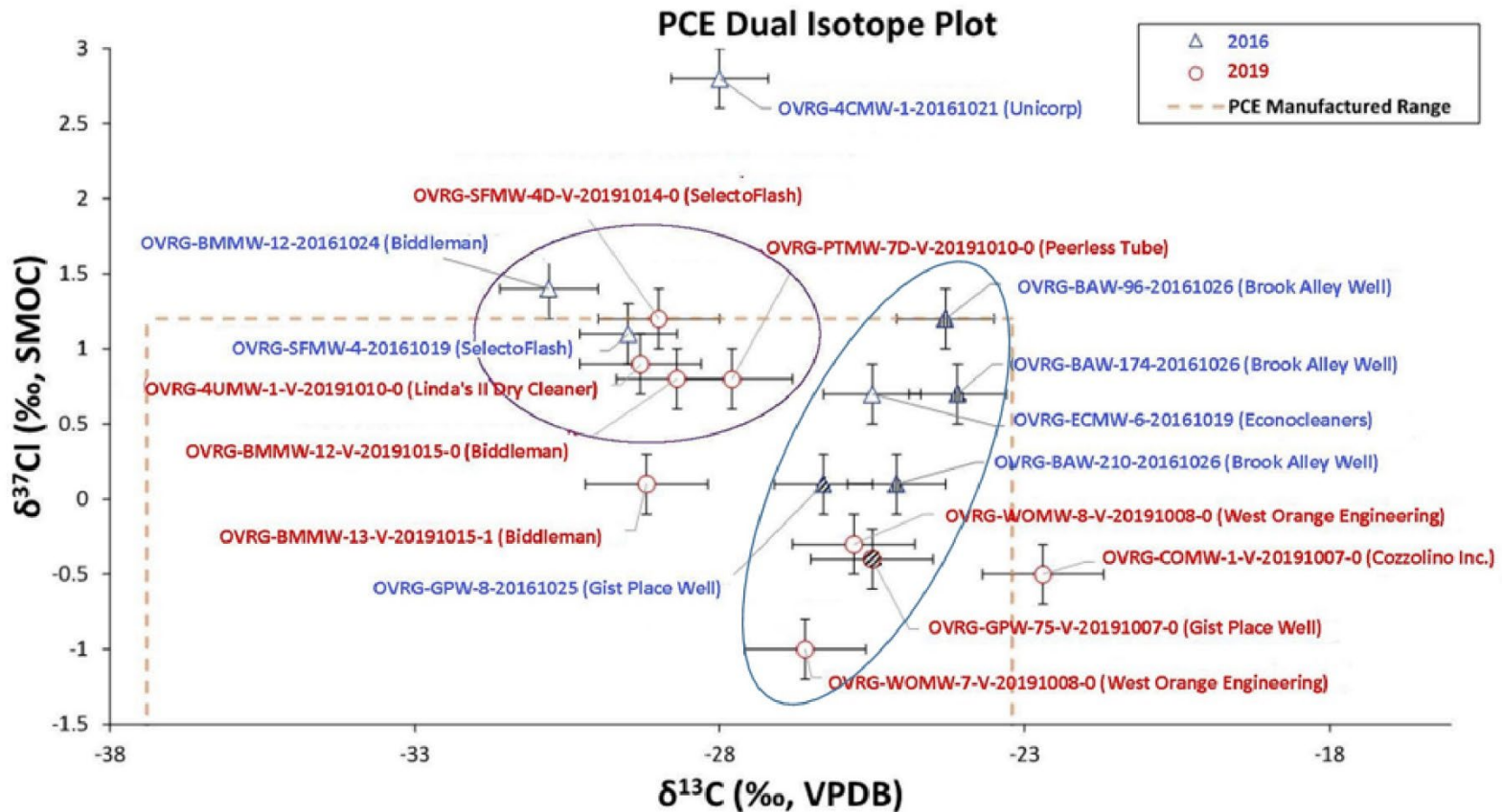


Notes:

Figure provided by Microbial Insights.

Dual-isotope plot of TCE from 2016 sampling event (triangles) and 2019 sampling event (circles). Striped data points indicate receptor wells.

2019 CSIA Presentation



Notes:

Figure provided by Microbial Insights.

Dual-isotope plot of PCE from 2016 sampling event (triangles) and 2019 sampling event (circles). Striped data points indicate receptor wells. Two major groupings can be observed (represented by purple and blue circles).



PCE Potential Source Groupings
ORANGE VALLEY REGIONAL GROUNDWATER

FIGURE 8

OVRG SUPERFUND SITE

2019 CSIA Sample Results

- Two isotopically distinct sources of PCE – one originates near BMMW-12/SFMW-4, the other upgradient of the West Orange Engineering Site
- A wide range of isotopic values exists for TCE, with no clear trend
- Lack of hydrogen isotope data for most of the TCE results limits the interpretations
- Lack of a TCE trend may be due to simultaneous TCE degradation and formation of TCE from PCE degradation
- Reductive dechlorination appears to be relatively slow
- Groundwater flow patterns within the region are extremely complex
- It is unlikely that the Brook Alley and Gist Place wells have been impacted by Biddleman or SelectoFlash
- The Brook Alley well and Gist Place well appear to have been contaminated by the same source
- Isotopic data suggests PCE impacted water at Gist Place and Brook alley also impacts the northwestern area. Results of the West Orange Engineering samples may show it may be closest to the original source.

Discussion of Next Steps

Sites of Interest Near Gist Place Well



SITES OF INTEREST
ORANGE VALLEY REGIONAL GROUNDWATER

FIGURE XX



Image capture: Jun 2019 ©

Lakeside Avenue view looking west from West Orange Engineering area

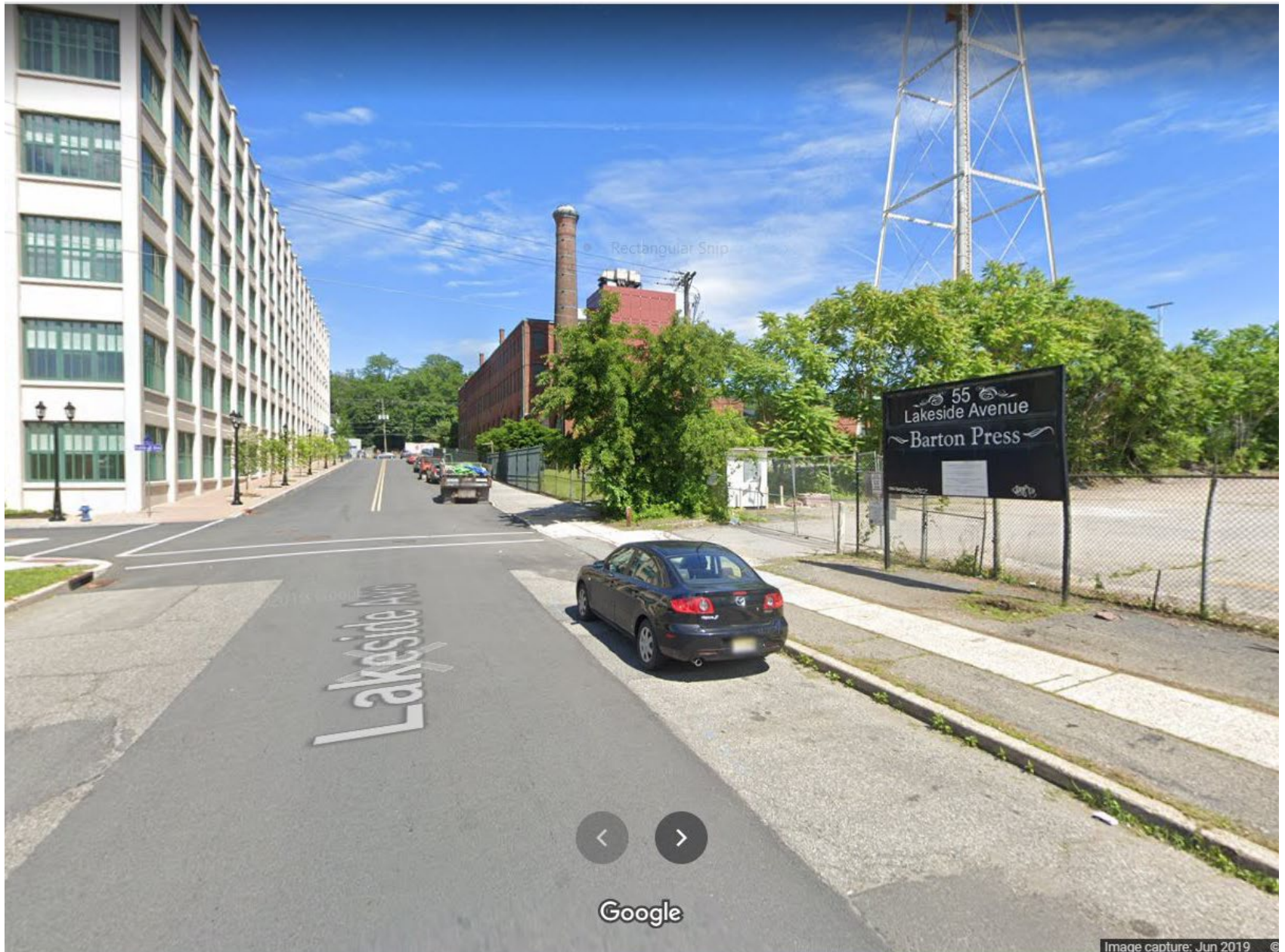
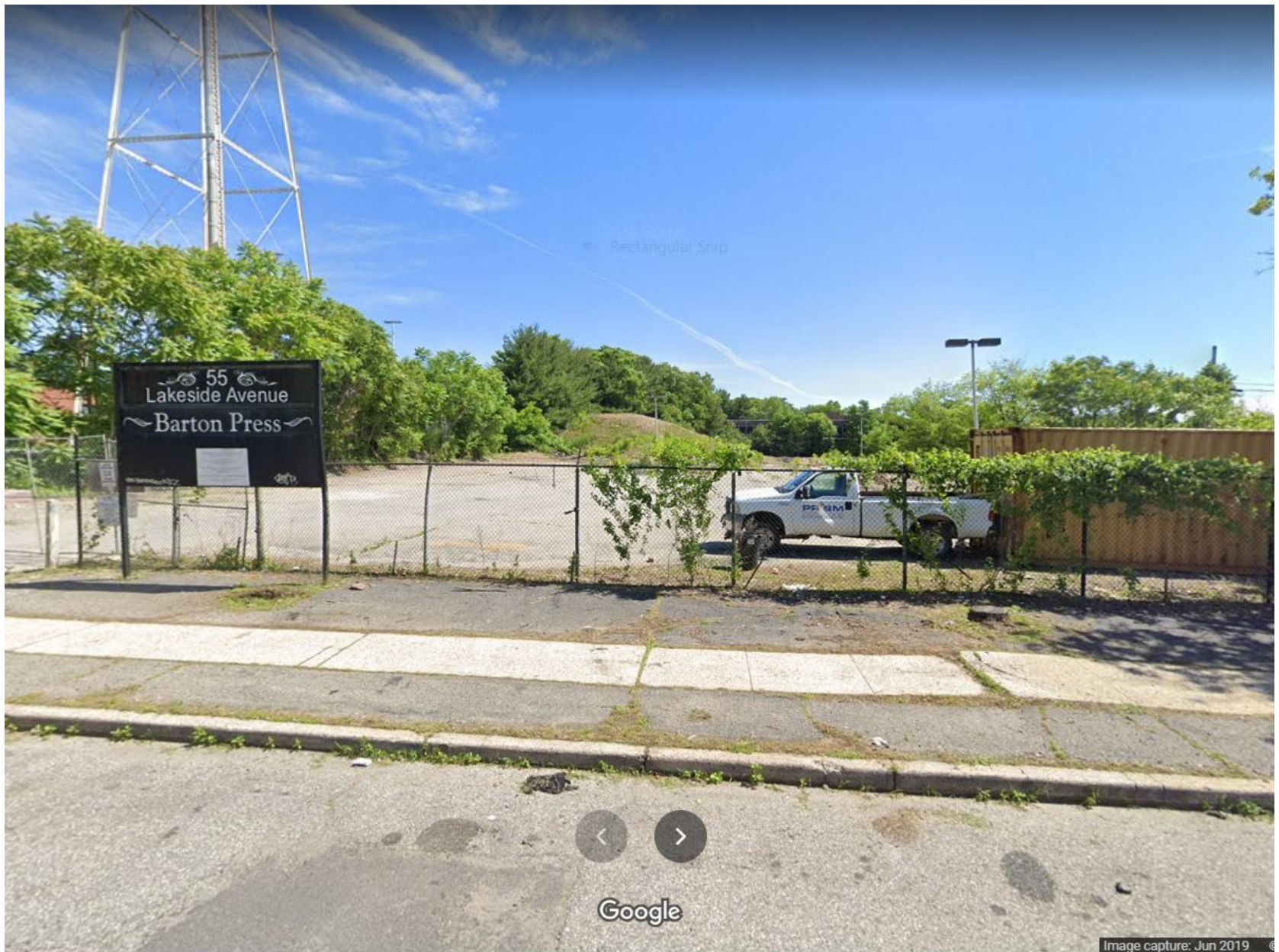
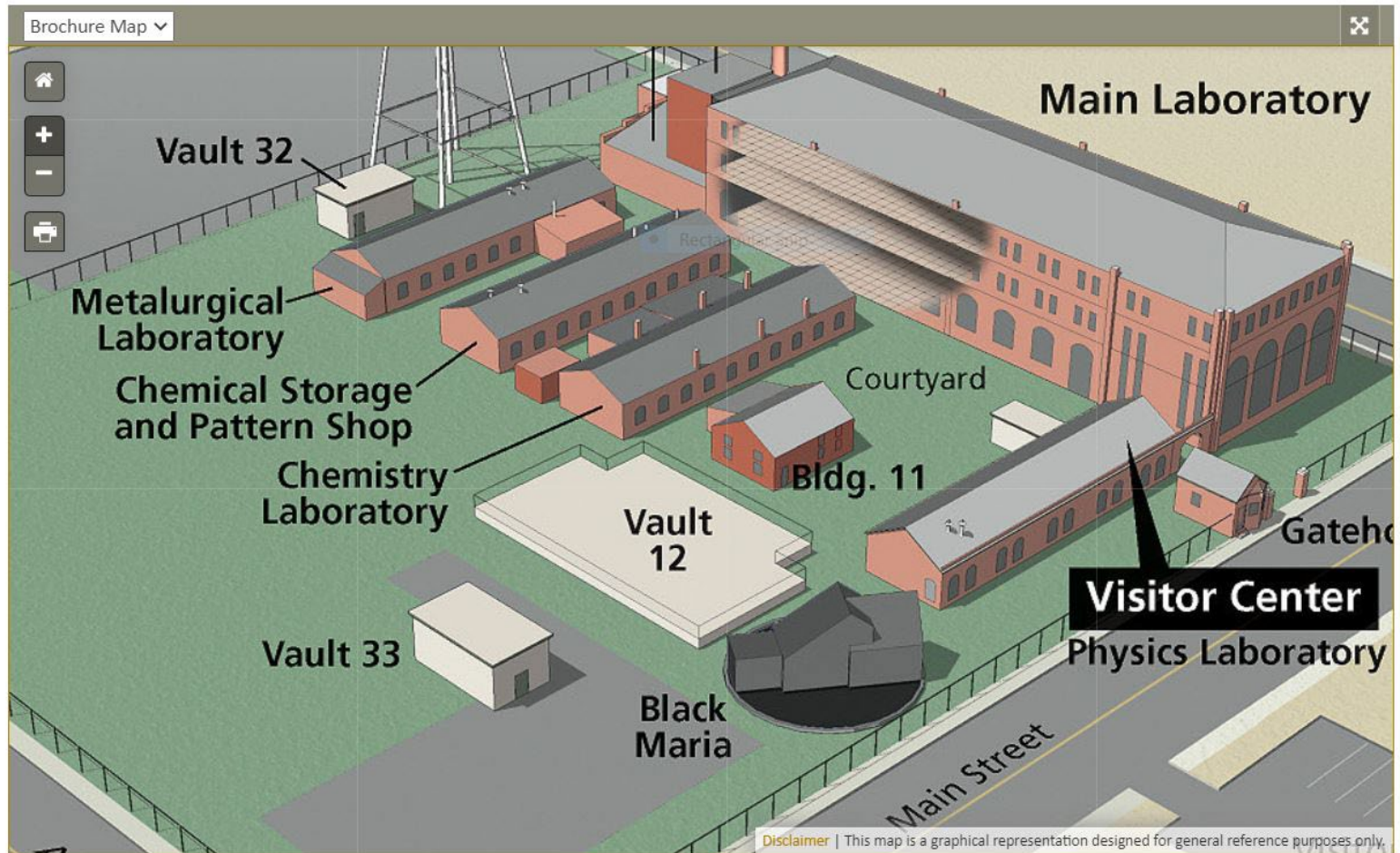


Image capture: Jun 2019 ©

Lakeside Avenue view looking west from Barton Press area



Barton Press Site looking north from Lakeside Avenue



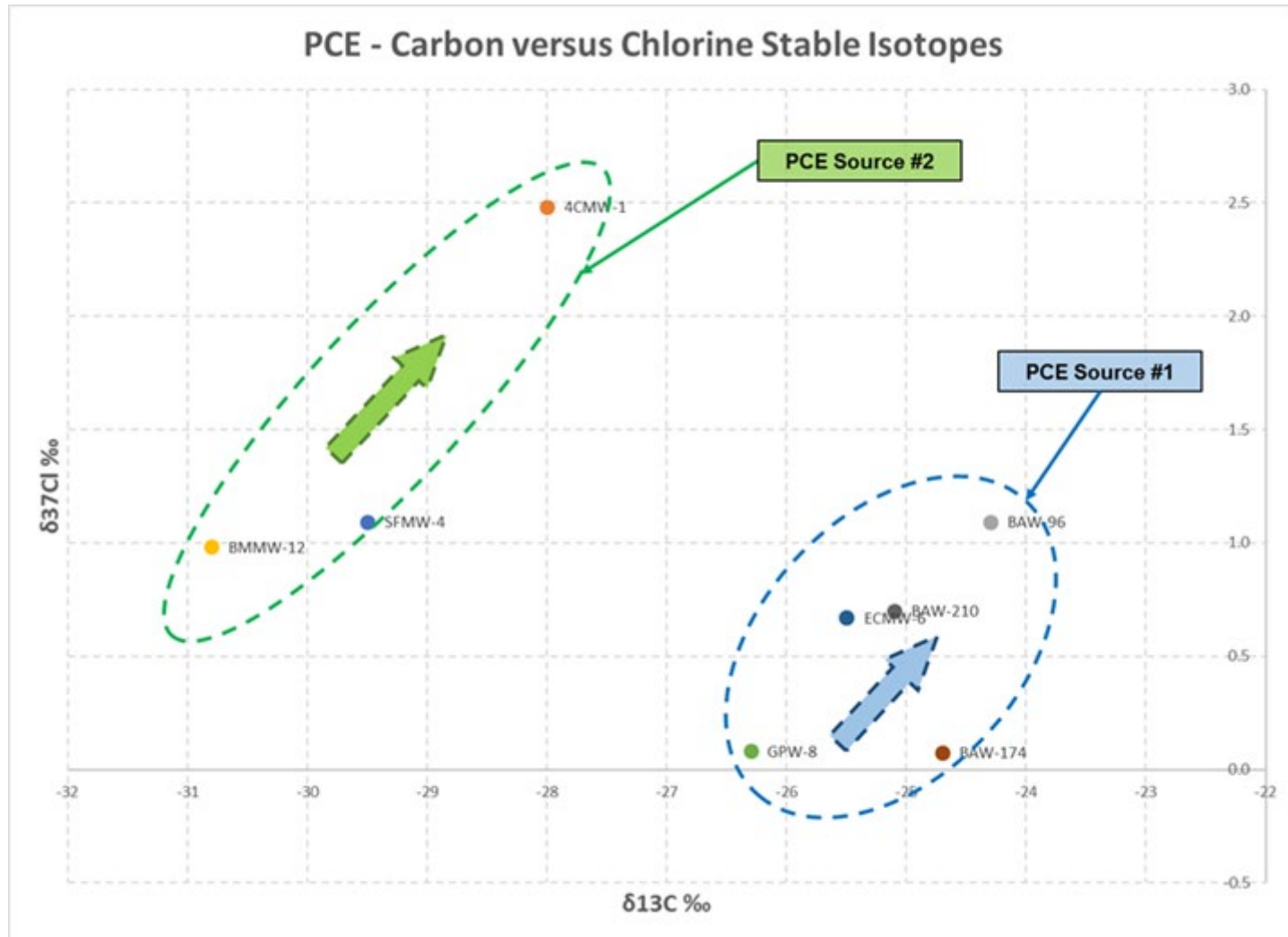
Last updated: March 9, 2016

Thomas Edison NHP Brochure

Next Steps

- Research about 25% of 117 existing wells near Thomas Edison NHP area and 54 wells near Central Avenue plume and Lakeside Avenue area
- Round 1 GW sampling: to include about 40 existing wells from the 2 areas
- Survey sampled wells for uniform water level elevation datum
- Determine the need for new wells. If needed, install up to 3 wells for each plume (Central Avenue plume and Lakeside Avenue plume), or 6 wells total
- Rounds 2 and 3 GW sampling: will be based on the findings from Round 1 sampling. Estimated 30 of the existing monitoring wells will produce usable data from the Round 1 sampling and will be sampled again for Rounds 2 and 3. Rounds 2 and 3 will include any newly installed wells.
- Sample parameters will include VOCs, PFAS and MNA parameters
- ALL OTHER ACTIVITIES SHALL BE PERFORMED AS PER THE EXISTING WORK PLAN

2016 CSIA Presentation



2016 CSIA Presentation

